CLAIMS

1. A method for reducing the amount of ammonia compounds affixed to fly ash, the method comprising:

providing an amount of fly ash, at least a portion of the amount of fly ash comprising particulates having ammonia compounds affixed to the particulates; and

exposing the amount of fly ash to flowing air having a temperature of at least 1,500°F (815°C).

2. The method of claim 1 wherein:

the fly ash is maintained in the flowing air until the fly ash reaches a temperature of at least 900°F (482°C).

3. The method of claim 1 further comprising:

measuring an in process ash temperature of the fly ash when the fly ash is exposed to the flowing air;

removing at least a portion of the fly ash being exposed to the flowing air when the measured in process ash temperature reaches at least 900°F (482°C);

thereafter providing a second amount of fly ash, at least a portion of the second amount of fly ash comprising particulates having ammonia compounds affixed to the particulates; and

thereafter exposing the second amount of fly ash to flowing air having a temperature of at least 1,500°F (815°C).

4. The method of claim 1 further comprising:

preheating the fly ash to a temperature of at least 300°F (148°C) before exposing the fly ash to the flowing air.

5. The method of claim 1 further comprising:

recovering heat from the flowing air after the fly ash has been exposed to

the flowing air.

6. The method of claim 5 further comprising:

using the heat recovered from the flowing air to preheat a second amount of fly ash, at least a portion of the second amount of fly ash comprising particulates having ammonia compounds affixed to the particulates; and

thereafter exposing the second amount of fly ash to flowing air having a temperature of at least 1,500°F (815°C).

7. The method of claim 6 wherein:

the second amount of fly ash is preheated to a temperature of at least 300°F (148°C)

8. The method of claim 5 further comprising:

removing particulate material from the flowing air after heat has been recovered from the flowing air.

9. The method of claim 8 further comprising:

maintaining the flowing air above 400°F (204°C) when particulate material is removed from the flowing air.

10. The method of claim 7 further comprising:

recovering heat from the particulate material after the particulate material has been removed from the flowing air.

11. The method of claim 10 further comprising:

using the heat recovered from the particulate material to preheat a second amount of fly ash, at least a portion of the second amount of fly ash comprising particulates having ammonia compounds affixed to the particulates; and

thereafter exposing the second amount of fly ash to flowing air having a temperature of at least 1,500°F (815°C).

12. The method of claim 11 wherein:

the second amount of fly ash is preheated to a temperature of at least 300°F (148°C)

12 13. The method of claim 1 further comprising:

recovering heat from the fly ash after the fly ash has been exposed to the flowing air.

Sub a4 14. The method of claim 13 further comprising:

using the heat recovered from the fly ash to preheat a second amount of fly ash, at least a portion of the second amount of fly ash comprising particulates having ammonia compounds affixed to the particulates; and

thereafter exposing the second amount of fly ash to flowing air having a temperature of at least 1,500°F (815°C).

15. The method of claim 14 wherein:

the second amount of fly ash is preheated to a temperature of at least 300°F (148°C)

15 16. The method of claim 1 wherein the step of exposing the fly ash to flowing air comprises:

providing a metal media having openings;

passing flowing air through the openings; and

depositing the fly ash on the metal media.

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16 17. The method of claim 16 wherein:

the openings are 10 microns or less.

Sub 5 18. The method of claim 16 wherein:

the flowing air is passed through the openings at greater than 0 to about 10 cubic feet (0.28 cubic meters) per minute.

18 19. The method of claim 1 further comprising:

measuring an in process ash temperature of the fly ash when the fly ash is exposed to the flowing air; and

controlling a flow rate of the flowing air in response to the measured in process ash temperature.

20. A method for reducing the amount of ammonia compounds affixed to fly ash, the method comprising:

providing an amount of fly ash, at least a portion of the amount of fly ash comprising particulates having ammonia compounds affixed to the particulates; and

exposing the amount of fly ash to flowing air until the fly ash reaches a temperature of at least 900°F (482°C).

21. An apparatus for reducing the amount of ammonia compounds affixed to fly ash, the apparatus comprising:

a source (10) of fly ash, at least a portion of the fly ash comprising particulates having ammonia compounds affixed to the particulates;

a heating chamber (17) including a treatment bed (20) comprising a media having openings;

a fly ash supply conduit (16) in communication with the heating chamber (17) and the source (10) of fly ash, the fly ash supply conduit (16) transferring fly ash from the source (10) of fly ash to the treatment bed (20) of the heating chamber (17);

a source (45) of heated air;

an air supply conduit (55) in communication with the source (45) of heated air and the heating chamber (17), the air supply conduit (55) providing a flow of heated air to the treatment bed (20) of the heating chamber (17) for contacting the fly ash on the treatment bed (20) with the flow of heated air;

a heated air conduit (37) in communication with the heating chamber (17) for transferring the flow of heated air from the heating chamber (17); and

an ash removal conduit (31) in communication with the heating chamber (17) for transferring heated fly ash from the heating chamber (17).

22. The apparatus of claim 21 further comprising:

a heater (15) for heating the fly ash passing through the fly ash supply conduit (16).

23. The apparatus of claim 21 further comprising:

a heat recovery unit (32) for recovering heat from heated fly ash passing through the ash removal conduit (31).

24. The apparatus of claim 23 further comprising:

a heater (15) for heating the fly ash passing through the fly ash supply conduit (16), the heater (15) receiving heat recovered by the heat recovery unit

(32) from heated fly ash.

25. The apparatus of claim 21 further comprising:

a heat recovery unit (35) for recovering heat from the flow of heated air passing through the heated air conduit (37).

26. The apparatus of claim 25 further comprising:

a heater (15) for heating the fly ash passing through the fly ash supply conduit (16), the heater (15) receiving heat recovered by the heat recovery unit (35) from the flow of heated air.

27. The apparatus of claim 25 further comprising:

a particulate filter (36) in communication with the heated air conduit (37), the particulate filter (36) removing particulate material from the flow of heated air from the heating chamber (17).

28. The apparatus of claim 27 further comprising:

a particulate material conduit (33) for transferring particulate material from the particulate filter (36),

wherein a second heat recovery unit (32) recovers heat from the particulate material passing through the particulate material conduit (33).

29. The apparatus of claim 25 further comprising:

a nitrogen oxide treatment system (81) in communication with the heated air conduit (37) for receiving the flow of heated air from the heating chamber (17).

30. The apparatus of claim 21 wherein:

the media is made from a metallic material and has openings of 10 microns or less.

31. The apparatus of claim 21 further comprising:

a controller (29) in electrical communication with at least one temperature sensor (28) for sensing a temperature of the fly ash on the treatment bed (20); and

a feeder (12) for controlling the feed of fly ash from the source (10) of fly ash to the fly ash supply conduit (16), the feeder controlling the feed of fly ash in dependence on the sensed temperature of the fly ash on the treatment bed (20).

32. The apparatus of claim 21 further comprising:

a controller (29) in electrical communication with at least one temperature sensor (28) for sensing a temperature of the fly ash on the treatment bed (20); and

a valve (70) for controlling the flow rate of heated air to the treatment bed (20) of the heating chamber (17) from the source (45) of heated air in dependence on the sensed temperature of the fly ash on the treatment bed (20).

33. The apparatus of claim 21 further comprising:

aeration stones (13) in the source (10) of fly ash, the aeration stones (13) receiving air from an air supply unit (49) for aeration of the fly ash.

34. The apparatus of claim 21 wherein:

the treatment bed (20) of the heating chamber (17) is downwardly sloped.

35. The apparatus of claim 34 wherein:

a lower section of the treatment bed (20) includes a blocking means (25) to control flow of heated fly ash from the heating chamber (17).